DOCUMENT RESUME

ED 131 115 TM 005 840

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TITLE Reading and Mathematics Observation System: Description and Measurement of Time Usage in the Classroom.
PUB DATE [Apr 76]
NOTE 19p.; Paper presented at the Annual Meeting of the American Educational Research Association (60th, San Francisco, California, April 19-23, 1976); For related documents, see ED 127 364-375 and TM 005 839-844

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Academic Achievement; *Classroom Observation Techniques; *Effective Teaching; Elementary Education; Grade 2; Grade 5; *Mathematics; *Reading; Student Behavior; Teacher Behavior; *Time
IDENTIFIERS *Beginning Teacher Evaluation Study Phase II; RAMOS; *Reading and Mathematics Observation System

ABSTRACT

The Beginning Teacher Evaluation Study, Phase II, was a research project on effective teaching behavior--what teachers do that significantly affects what and how pupils learn. The purposes of Phase II were to (1) develop an assessment system for measuring teacher and student behaviors and other factors which could influence each of them and their interrelationships and (2) generate hypotheses about the interrelationships among teacher and pupil behaviors and related factors. Subjects were 41 second grade and 54 fifth grade experienced teachers in eight school districts in California. The Reading and Mathematics Observation System (RAMOS) was one of two observational systems used in the study. With RAMOS, a trained observer can record continuously the events in a regular classroom in comprehensive detail and in real time. The system permits the observer to focus either on the teacher, a group of students, or a small number of target students, depending on the purpose of the observation. "Scores" from the observations were used as measures of teacher performance for the analyses done in the study. (RC)

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Reading and Mathematics Observation System: Description and Measurement of Time Usage in the Classroom*

by

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IM005 840

*Speech presented at the American Educational Research Association Meeting in San Fransicso, California, April 1976.

Reading and Mathematics Observation System: Description and Measurement of Time Usage in the Classroom*

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The Reading and Mathematics Observation System, RAMOS, is designed for real time documentation of classroom activities of teachers, student groups, or individual students. It is best suited to observation of classroom instruction in the areas of reading and mathematics at the elementary level. With it, a trained observer can record continuously the events in a regular classroom in comprehensive detail and in real time. The system permits the observer to focus either on the teacher, a group of students, or a small number of target students, depending on the purpose to the observation.

Once an observation interval (generally between 30 minutes and an hour) is initiated, the observer records the events that transpire as a series of "line," each line containing categorical entries describing the nature of the event. These lines provide answers to such questions as:

> Who are the students being observed? How many are there in the group? Where are they located in the room? Which target students, if any, are in the group?
>
> Who are the adults in the classroom? How many adults are there? Where are they, and with what student groups are they associated?

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*Speech presented at the American Educational Research Association Meeting in San Francisco, April 1976.

What is going on at any given time? What is each student group and adult doing? If engaged in an instructional activity, how many students and adults are involved, and where are they?

Who is doing the instructing? What is the nature of the instructor (teacher, aide, volunteer, tutor, etc.)? What role is the instructor playing (direct instruction, discipline, class management, etc.)?

What is the content of instruction? What subject matter is being taught? What skills and activities are involved? What materials are being used? What kinds of feedback are available to the students?

What is the response of the group to instruction? What kind of responses are required or expected of the students? What is the judged level of attention to instruction? Relative adequacy of performance? Amount of social interaction between students?

From the records obtained in this manner, several measures were extracted for the purposes of the BTES project. The primary aim of these measures is to describe the manner in which time is used in the classroom. The measures included (1) total time spent on activities directly or indirectly related to reading and mathematics, (2) the character and variety of those activities, and (3) the relative distribution of time spent in various activities.

Procedures for Conducting a RAMOS Observation

A RAMOS observer used several forms while observing in Phase II classrooms: a Start Form, an Event Form, a Debriefing Form, a Classroom Summary Record, and General Descriptive comments. The Event Form is most basic to the results described in this paper.

Figure 1 about here

The Event Form (Figure 1) is a labeled coding form used for recording each classroom event or change in real time. The initial condition of all existing groups is fully described, the instructor and the content of instruction is documented, and certain aspects of the student response are recorded. After the first lines have been completed, further lines are added as necessary to document any discernible changes in a group or in a target student within a group. Movement of students between groups or the formation of a new group also requires a line.

Each event line records the time an event begins and indicate the group involved. Notations specific to instructors or target students are coded with the group association. Five major categories are recorded on each event line in RAMOS: Time, Group, Instructor, Content, and Response. Within each category, codes are entered in fields from the RAMOS Summary Codes sheet (Figure 2).

Figure 2 about here

The fields for the TIME category are time an event begins, recorded to the nearest minute on a 24-hour clock, and status, an indication of the focus of the observer at this time.

The GROUP category fields are the ID number indicating to which group the line applies, the number of students in the group, grid or relative position within space, location within room, and density of students in the group.

The INSTRUCTOR category describes the activities of the instructors at a given time by the following fields: instructor ID shows the specific instructor, followed by his classification, the role he is now assuming, his availability to students, how student-instructor interactions are being conducted, and mobility of the instructor.

The CONTENT category fields include the subject being studied, reading main and second skill, math main and second skill, main and secondary material, aim of instruction, activity used for instruction, feedback pattern of instructor, and feedback sign to students.

The RESPONSE category fields indicate the task assigned to the group of students, the focus of attention of the students, their level of social interaction, output rate, quality of performance, level of attention and involvement, physical activity, and noise level. There is also a column to record a code indicating when a specific target student is referred to by this line.

Analysis of RAMOS Protocols

The basic unit of analysis for the RAMOS protocols is the student minute--a single number minute of student time during a class period. The RAMOS analysis program computed, within each category of the system, the number of student minutes falling within each of the codes assigned to that category. For instance, suppose that, during a given episode, one group of ten students spends 20 minutes reading, 5 minutes in class business; a second group of six students spends 12 minutes in mathematics, 8 minutes in reading and 5 minutes in class business. Then under the SUBJECT category, the distribution of student minutes would be 248 for the Reading code (20 x 10 for the first group, plus 6 x 8 for the second), 72 for the Mathematics code (6 x 12 for the second group), and 80 for the Business code (10 x 5 for the first group, 6 x 5 for the second group). Of the total 400 minutes in the episode, the Reading code has the highest percentage, 62%, followed in second place by Business with 20% and

Mathematics with 18%. The analysis program computed the quantities--student minutes and percentages--for each code, and arranged the results in rank order from highest to lowest. The series of observations for each of the 95 teachers were then combined into a single record for use in various analysis. Each teacher-class was observed on two to eight occasions. The data are averages over all observational occasions, so we are dealing with a single cumulative observational record for each teacher-class.

The primary interest in this study was to uncover any strong relations of teacher characteristics and practices to student outcomes in reading and mathematics. Accordingly, time usage in the areas of reading (and other closely allied language arts) and mathematics was chosen for analysis. Within these subject matter areas, four major categories were selected: role of the instructor, aim of instruction, instructional activities, and main materials. These categories answer the questions: What was the teacher doing (Role), to what purpose (Aims), by what means (Activities), and with what resources (Materials)? These categories were chosen a priori as most likely to bear a relation to the overall pupil measures of reading and mathematics.

The relative distribution of time usage by the target teacher (the "main instructor") in the variety of roles in the RAMOS data set is shown in Tables 1-6.

Table 1 about here

Table 1 shows the breakdown of time usage in the different subject-matter codes. This table gives the proportion of teacher-class units in which the code was observed at least once, the mean percentage of student minutes falling in that code, over all teacher-class units, and the mean

student minutes for the subject of teacher-class units in which the code was observed at least once. For example, in grade 2, the subject-matter code "Language" was observed in 70% of the classes. The mean percent of student minutes falling in that code over all classes was 8.7; the mean percent of student minutes falling in that code for only classes in which the code was observed was 12.4.

Table 2 about here

The most noticeable result was the variation of direct instruction and facilitation as a function of grade level and subject matter (Table 2). Direct instruction includes situations in which the instructor is maintaining direct control over learning activity. Facilitation refers to activities in which the students work independently, but the instructor provides advice and feedback at the student's request or as a result of the instructor's direct observation.

The results indicated that reading and language arts were much more likely to proceed by direct instruction, whereas mathematics was more likely to be under the student's control with the teacher providing help when the student asks for it or when the teacher sees something that requires attention. Direct instruction is far more common in second grade than fifth grade, in both reading and language arts and in mathematics.

Management, evaluation, and other activities occupied about 25 percent of the instructor's time under all conditions. Assessment and evaluation are more likely to take up time in observable ways in second grade than in fifth grade.

Table 3 about here

The second major dimension is related to the aim of instruction (Table 3). The dominant aim, accounting for most of the time, is practicing skills, either directly or through review of some sort. Relatively little

time was spent on new ideas or topics, and only in fifth grade language arts was any substantial amount of time spent in the application of knowledge, skills on concepts to practical problems beyond a school context.

Table 4 about here

The breakdown of time usage by grade and subject matter for the category of Instructional activities (Table 4) suggested that students spent most of their time at seatwork. Fifth graders were observed to do so much more than second graders, and seatwork was observed more frequently in mathematics than in reading. This pattern parallels the variation in facilitation as an instructional role. Discussions and question-answer episodes took up about 20 to 25 percent of the time. About 10 percent of the reading time in second grade was spent in oral reading recitation and about the same proportion of the mathematics time was spent in games of some sort.

Table 5 about here

The breakdown of time usage by grade and subject matter for the category Main materials (Table 5) suggested that there was large shifts in patterns of materials usage which were a function of grade level and subject matter. Main instructional materials were those that seemed of chief importance to the activity carried out by the student. If other materials also played a significant role, this was recorded as secondary material. Secondary material (Table 6) reflects the extensiveness of the instructional materials being used at the time in the classroom. For example, in mathematics instruction, it is the difference between a lesson in a workbook and a lesson in which the student also uses a number scale to check his work. An example in reading is the difference between a lesson where the student reads to himself from a book and one in which he records his thoughts and reactions in writing as he reads.

Table 6 about here

There were large differences in the patterns of time usage as a function of grade level and subject matter. Books were used more in reading than in mathematics, and more at the later than the earlier grades--an expected result. Workbooks were common everywhere, but especially in second grade mathemtics. They also occupied a surprising amount of the time in fifth grade language arts and reading. About 15 to 20 percent of the time, students were left on their own with paper and pencil. In second grade, students were working with no materials about 20 percent of the time; it seems likely that much of this time was accounted for by class discussion. Only in second grade mathematics was a considerable amount of time spent with manipulative (Cuisenaire rods, number scales, etc.) or equipment (film strip projectors, tape recorders, etc.). Generally, instruction in these classrooms was carried out with the old standbys--books, paper and pencils, and chalkboard.

Two sets of correlations among various combinations of the RAMOS variables were especially noteworthy. One seems to encompass a pattern of direct instruction in which books and workbooks are used by students at their seats for practice and review purposes. The second pattern appears to represent situations in which teachers are more likely to spend their time in something other than direct instruction. Students are engaged with new concepts and facts with unconventional materials and often in group discussion. More detailed examination of the data would be needed to confirm the existence of such patterns but they do seem to parallel descriptions of contrasting teaching styles found in contemporary classrooms.

These are the variables that were entered into the structural analysis. They summarize a great amount of information, and undoubtedly some useful relationships have been obscured along the way. However, given the thesis that total time usage is one of the more fundamental variables determining instructional effectiveness, these summary variables represent a reasonable choice for initial stages of hypotheses generation.

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McDonald, F. J., & Elias, P. J. The Effects of Teaching Performances on Pupil Learning. Beginning Teacher Evaluation Study, Phase II, 1973-74, Final Report, Volume I. Princeton, N. J.: Educational Testing Service, 1975, 1976.

School: Sample
Teacher: Smith

RAMOS EVENT FORM

A	B	C	D

TIME	STATUS	GROUP					INSTRUCTOR						CONTENT														RESPONSE									SERIAL CODE		
		GROUP I.D.	NUMBER	GRID	LOCATION	DENSITY	INSTRUCTOR I.D.	CLASSIFICATION	ROLE	AVAILABILITY	INTERACTION	MOBILITY	SUBJECT MATTER	READING Main Skill	READING Second Skill	MATH Main Skill	MATH Second Skill	Main MATERIAL	Second MATERIAL	AIM	ACTIVITY	FEEDBACK Pattern	FEEDBACK Sign	TASK	FOCUS	SOCIAL INTERACT	CONTACT	OUTPUT RATE	PERFORMANCE	ATTEN/INVOLV.	PHYS. ACTIVITY	NOISE	TARGET STUDENT			
1 2 3 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19 20	21 22	23 24	25 26	27	28	29 30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
0908	G	1	25	A	C	W	1	T	M	G	T	S	B	X X	X X	X X	X X	X	X	X X	X	X	X X	X X	L	N	M	M	L	L	M	M	M				
0912	T	2	10	V	C	S	1	T	M	G	T	S	B	X X	X X	X X	X X	X	X	X X	X	X	X X	X X	L	N	H	H	L	L	M	H	H				
0912	B	3	06	D	S	D	Q	X	X	X	X	X	R	D S	R S	X X	X X	W	P	P S	S	X	X X	W	L	M	M	H	H	H	L	L				
0912	B	4	09	S	T	S	Q	X	X	X	X	X	A	X X	X X	X X	X X	M	P	? ?	?	X	X X	P	L	H	L	M	M	H	H	H				
0912	B	1	00																																			
0914	T	9	27	W	?	D	L	T	M	S	T	S	B	X X	X X	X X	X X	X	X	X X	L	X	X X	P	N	H	M	L	L	L	H	H				
0905		The teacher stopped to collect Red Cross money																																				
0914	B	3	06	D	S	D							R	D S	R S			W	P	P S	S			W	L	L	L	H	H	L	L							
0918	B	4	11																																			
0918	B	2					1		N				R	D S	R A			C		P S	Q	E	+ U	A	L	M	M	M	?	?	L	L					
0925	T	2												R S	D S				B	X A	S	R		R		L	L			H							
0926	T	4		R			1		D	S	T	M	B									M	- T															
0926	B	2																							S													
0927	B	4																							S													
0934	T	2					1		N	G	R	S		R A								M	+ U	A		L	M	M	N	M	L	L					
0940	T	4																																				
0940	B	2			P	S	D	0					R	? ?	? ?			W			S			W	L	?	?	?	?	?	?	?					
0941	B	3						2	A	E	G	T	M									T	+ B															
1 2 3 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19 20	21 22	23 24	25 26	27	28	29 30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
TIME		GROUP					INSTRUCTOR						CONTENT														RESPONSE									SERIAL CODE		

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Figure 1.

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1 -4 Time:
24 Hr. clock
0000 Start file
0001 Gener info. line
0002 Group ID line
0003 Instructor ID line
0004 Continuation line
0005 General comment
0006 to
0030 Field-specific com.
0099 End file

Group

5 Status:
G Group
T Teacher only
P Part of a group
S Specific students
B Background only
N Not being observed

6 Group ID:
from START

7-8 Number in group:
01-99

9 Grid:
code from START

10 Location:
S Students seats
T Table for group work
C Circle grouping
G Game Area
D Desk of teacher
L Library area
B Blackboard
N Not fixed or moving

11 Density:
D Dispersed singly or in twos
S Small groups
C Cluster of majority
W Whole class together

INSTRUCTOR

12 Instructor ID
From Start

13 Classification:
T Teacher
R Resource teacher
N Intern teacher
A aide
V Volunteer
C Crossage tutor

14 Role:
N Instruction
F Facilitation
D Discipline
M Manage class
A Assess/diagnose
E Evaluate for mastery
P Preparation
S Supervise staff
I Independent

15 Availability:
A Available
N Not available
E Emergency
S Specific student
G Group being taught

16 Interaction:
T Instructor chosen
V Volunteers chosen by instructor
H Help sought by students
B Both student and instructor initiate
R Routine of turns

17 Mobility:
M Mobile
L Limited
S Stationary

CONTENT

18 Subject:
R Reading
L Language
M Math
C Science
S Social Studies
A Art/music
B Business of class
F Free choice
W Wait time
P Playtime, recess

19-22 Reading Skills:
DS Decoding, simple
DA Decoding, adv.
SS Structural analysis, simple
SA Structural analysis, adv.
SY Syllabification
WM Word meaning
DW Dictionary work
RA Reading aloud
RS Assign. silent reading
RR Recreational reading
CF Compre. lit facts
CM " main ideas
CR " relations
CE " external. infer.
CS " sequence
CA " apprec.
CC " conclu.
GR Grammar
PU Punctuation
PS Practice spelling
PP Penmanship
WA Assigned writing
WC Creative writing

23-26 Math Skills:
B_ Basic facts
S_ simple
A_ Advanced
F_ Fraction
D_ Decimal
%_ Percent, ratio, prob.
W_ Word problem
_+ Addition
_- Subtraction
_* Multiplication
_/ Division
_R Relationships
RS Set relations
GR Graphing
GE Geometry
ME Measurement
TM Time
$$ Money

27-28 Material:
B Book
C Chart/chalkboard
W Workbook
M Manipulative
P PaperPencil
E Equipment

29-30 Aim:
N_ New
P_ Practice
R_ Review
A_ Application
_C Concept
_S Skill
_F Fact

31 Activity:
L Lecture
D Discussion
S Seatwork
R Recital - reading rec
Q Question-answer
A Audio Visual
G Game
V Visual demonstra.

Feedback

32 Pattern:
D Delayed verbal
M Immediate verbal
E Expression
P Physical contact
T Token
W Written

33-34 Feedback Sign:
+_ Positive
-_ Negative
B_ Both
_U Undifferentiated
_T Task specific
_B Both

Group Response

35 Task:
L Listen
S Speak
R Read silently
A Read aloud
W Write
P Physical act

36 Focus:
M Instructor
C Classmates
L Learning material
S Something else

37 Social Interaction:
38 Contact with instructor
39 Output rate
40 Performance
41 Attention/involvement
42 Physical activity
43 Noise

H High
M Medium
L Low
X None

Special codes:
X Stop code
? Uncertain

RAMOS

SUMMARY CODES

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Figure 2.

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Table 1

Basic Statistics for Time Usage
in Subject-Matter Category

	Code	% of classes with code observed	Mean % Student Minutes	
			Over all classes	Given code observed
Grade 2	Reading	100	38.4	38.4
	Language	70	8.7	12.4
	Math	98	21.7	22.2
	Science	18	2.9	16.7
	Soc. St.	13	1.3	9.8
	Art/Music	38	2.4	6.3
	Business	85	8.6	10.1
	Free Choice	55	4.6	8.3
	Wait	60	3.3	5.5
	Play	50	3.1	6.2
Grade 5	Reading	96	34.2	35.6
	Language	76	13.6	17.7
	Math	98	25.2	25.7
	Science	16	1.2	7.5
	Soc. St.	41	6.8	16.6
	Art/Music	14	1.4	2.0
	Business	80	6.9	8.6
	Free Choice	31	2.3	7.4
	Wait	67	3.6	5.4
	Play	20	1.0	5.0

Table 2

Basic Statistics for Time Usage in Role of Main Instructor Category

	Code	Reading and Language (Total X = 47.1)				Mathematics (Total X = 21.6)			
		X of Classes with code observed	Mean X Student Minutes		X out of total for subject matter	X of Classes with code observed	Mean X Student Minutes		X out of total for subject matter
			Over all classes	Given code observed			Over all classes	Given code observed	
Grade 2	Instruction	92.5	19.1	20.6	40.5	95.0	9.6	12.0	44.4
	Facilitation	67.5	8.4	12.4	17.7	60.0	6.8	11.4	31.6
	Discipline	27.5	0.9	3.2	1.9	17.5	0.4	2.0	1.6
	Manage	37.5	2.9	7.6	6.1	17.5	1.0	5.6	4.5
	Assess/Diag.	32.5	2.8	8.6	5.9	17.5	1.1	6.4	5.2
	Evaluate	27.5	1.9	6.7	3.9	10.0	.5	5.0	2.3
	Preparation	15.0	1.2	8.0	2.6	12.5	.9	7.2	4.2
	Independent	25.0	1.6	6.3	3.4	5.0	.2	2.0	.7

	Code	Reading and Language (Total X = 47.8)				Mathematics (Total X = 25.2)			
		X of Classes with code observed	Mean X Student Minutes		X out of total for subject matter	X of Classes with code observed	Mean X Student Minutes		X out of total for subject matter
			Over all classes	Given code observed			Over all classes	Given code observed	
Grade 5	Instruction	86.3	13.9	16.1	29.0	61.8	7.5	12.3	29.7
	Facilitation	88.2	16.2	18.4	33.9	82.4	11.9	14.5	47.4
	Discipline	19.6	.9	4.7	1.9	15.7	.8	4.9	3.0
	Manage	45.1	2.7	5.9	5.6	39.2	1.4	3.5	5.4
	Assess/Diag.	29.4	1.7	5.7	3.5	17.7	.8	4.6	3.2
	Evaluate	17.7	1.3	7.1	2.6	5.9	.5	8.0	1.9
	Preparation	27.5	2.0	7.1	4.1	7.8	.2	2.8	.9
	Independent	33.3	1.8	5.3	3.7	5.9	.1	2.3	.6

Table 3

Basic Statistics for Time Usage in Aim of Instruction Category

	Code	Reading and Language (Total Σ = 47.1)				Mathematics (Total Σ = 21.6)			
		Σ of Classes with code observed	Mean Σ Student Minutes		Σ out of total for subject matter	Σ of Classes with code observed	Mean Σ Student Minutes		Σ out of total for subject matter
			Over all classes	Given code observed			Over all classes	Given code observed	
Grade 2	New Concept	15.0	.9	5.7	1.8	12.5	.7	5.6	3.2
	New Skill	5.0	.9	18.0	1.9	5.0	.3	5.5	1.3
	New Fact	20.0	1.1	5.3	2.2	5.0	.4	7.0	1.6
	Practice Concept	7.5	.2	2.0	.3	15.0	.6	3.7	2.6
	Practice Skill	95.0	25.5	26.8	54.1	77.5	10.5	13.5	48.6
	Practice Fact	30.0	2.0	6.6	4.2	20.0	1.7	8.3	7.6
	Review Concept	17.5	.4	2.1	.8	15.0	.9	5.8	4.1
	Review Skill	30.0	2.4	7.9	5.1	35.0	3.4	9.8	15.8
	Review Fact	37.5	4.2	11.2	8.9	15.0	.6	3.7	2.6
	Appl. Concept	17.5	.8	4.3	1.6	0	0	0	0
	Appl. Skill	30.0	2.1	7.1	4.5	10.0	.7	7.0	3.2
	Appl. Fact	2.5	0.1	5.0	.3	0	0	0	0
	Code	Reading and Language (Total Σ = 47.8)				Mathematics (Total Σ = 25.2)			
		Σ of Classes with code observed	Mean Σ Student Minutes		Σ out of total for subject matter	Σ of Classes with code observed	Mean Σ Student Minutes		Σ out of total for subject matter
			Over all classes	Given code observed			Over all classes	Given code observed	
Grade 3	New Concept	11.8	1.9	16.5	4.1	5.9	.2	2.7	.6
	New Skill	7.8	.5	6.0	1.0	3.9	.1	2.5	.4
	New Fact	21.6	1.5	7.1	3.2	9.8	.6	6.4	2.5
	Practice Concept	11.8	.9	7.7	1.9	13.7	1.0	7.1	3.9
	Practice Skill	88.2	24.4	27.7	51.1	84.3	14.0	16.6	55.6
	Practice Fact	27.5	2.1	7.7	4.4	19.6	1.0	4.9	3.8
	Review Concept	17.7	.8	4.3	1.6	11.8	0.4	3.7	1.7
	Review Skill	27.5	2.2	7.9	4.6	37.3	2.6	7.1	10.4
	Review Fact	35.3	2.3	6.6	4.8	17.7	1.4	8.0	5.6
	Appl. Concept	19.6	1.9	9.7	4.0	3.9	.2	4.0	.6
	Appl. Skill	29.4	1.8	6.0	3.7	13.7	.8	5.7	3.1
	Appl. Fact	15.7	1.9	12.2	4.0	3.9	.4	10.0	1.5

Table 4

Basic Statistics for Time Usage in Instructional Activity Category

Grade 2

Code	Reading and Language (Total % = 47.1)				Mathematics (Total % = 21.6)			
	% of Classes with code observed	Mean % Student Minutes		% out of total for subject matter	% of Classes with code observed	Mean % Student Minutes		% out of total for subject matter
		Over all classes	Given code observed			Over all classes	Given code observed	
Lecture	25.0	.6	2.5	1.3	0	0	0	0
Discussion	55.0	2.9	5.3	6.2	37.5	2.4	6.3	11.0
Seatwork	90.0	20.0	22.2	42.4	82.5	10.8	13.0	49.8
Recital	50.0	4.3	8.6	9.1	2.5	.1	3.0	.4
Question/Ans.	70.0	7.0	9.9	14.8	45.0	3.2	7.1	14.7
Audio/Visual	12.5	2.7	21.4	5.7	5.0	.3	6.5	1.5
Game	25.0	1.2	4.8	2.6	27.5	1.8	6.4	8.1
Demonstr.	10.0	.8	8.3	1.7	12.5	.7	5.4	3.2

Grade 5

Code	Reading and Language (Total % = 47.8)				Mathematics (Total % = 25.2)			
	% of Classes with code observed	Mean % Student Minutes		% out of total for subject matter	% of Classes with code observed	Mean % Student Minutes		% out of total for subject matter
		Over all classes	Given code observed			Over all classes	Given code observed	
Lecture	23.5	1.9	8.1	4.0	21.6	.8	3.8	3.3
Discussion	56.9	4.9	8.6	10.2	31.4	1.6	5.0	6.2
Seatwork	96.1	27.0	28.1	56.6	92.2	15.7	17.1	62.5
Recital	47.1	2.9	6.2	6.1	0	0	0	0
Question/Ans.	60.8	4.4	7.2	9.1	43.1	2.9	6.7	11.4
Audio/Visual	7.8	.5	5.8	.9	2.0	.1	4.0	.3
Game	9.8	.6	6.4	1.3	19.6	1.1	5.5	4.3
Demonstr.	3.9	.1	2.0	.2	9.8	.5	4.8	1.9

Table 5

Basic Statistics for Time Usage in Instructional Material Category (Primary)

Grade 2

Code	Reading and Language (Total % = 47.1)				Mathematics (Total % = 21.6)			
	% of Classes with code observed	Mean % Student Minutes		% out of total for subject matter	% of Classes with code observed	Mean % Student Minutes		% out of total for subject matter
		Over all classes	Given code observed			Over all classes	Given code observed	
Book	92.5	13.4	14.5	28.5	15.0	.8	5.2	3.6
Chalkboard	52.5	3.5	6.7	7.5	47.5	3.8	8.1	17.7
Workbook	67.5	11.4	16.9	24.3	62.5	7.8	12.5	36.2
Manipulative	12.5	.8	6.0	1.6	17.5	1.4	8.0	6.5
Paper/Pencil	72.5	9.9	13.7	21.0	50.0	4.0	8.1	18.6
Equipment	10.0	1.2	12.0	2.6	25.0	1.5	5.9	6.9

Grade 5

Code	Reading and Language (Total % = 47.8)				Mathematics (Total % = 25.2)			
	% of Classes with code observed	Mean % Student Minutes		% out of total for subject matter	% of Classes with code observed	Mean % Student Minutes		% out of total for subject matter
		Over all classes	Given code observed			Over all classes	Given code observed	
Book	84.3	17.6	20.9	36.8	47.1	6.1	13.0	24.2
Chalkboard	27.5	2.0	7.1	4.1	45.1	3.5	7.7	13.9
Workbook	78.4	15.5	19.7	32.3	43.1	5.9	13.8	23.6
Manipulative	7.8	.3	4.3	.7	15.7	.5	3.1	1.9
Paper/Pencil	56.9	7.4	13.0	15.4	58.8	6.3	10.7	25.0
Equipment	19.6	0.9	4.7	1.9	9.8	.4	3.8	1.5

Table 6

Basic Statistics for Time Usage in Instructional Material Category (Secondary)

Grade 2

Code	Reading and Language (Total % = 47.1)				Mathematics (Total % = 21.6)			
	% of Classes with code observed once	Mean % Student Minutes		% out of total for subject matter	% of Classes with code observed once	Mean % Student Minutes		% out of total for subject matter
		Over all classes	Given code observed once			Over all classes	Given code observed once	
Book	40.0	2.2	5.5	4.7	0	0	0	0
Chalkboard	35.0	3.0	8.7	6.4	35.0	3.3	9.4	15.3
Workbook	32.5	2.1	6.3	4.5	27.5	1.2	4.5	5.6
Manipulative	12.5	1.1	8.4	2.3	20.0	1.6	8.1	7.4
Paper/Pencil	72.5	10.0	13.8	21.2	52.5	4.2	8.0	19.4
Equipment	7.5	.3	3.3	.6	12.5	.8	6.2	3.7

Grade 5

Code	Reading and Language (Total % = 47.8)				Mathematics (Total % = 25.2)			
	% of Classes with code observed once	Mean % Student Minutes		% out of total for subject matter	% of Classes with code observed once	Mean % Student Minutes		% out of total for subject matter
		Over all classes	Given code observed once			Over all classes	Given code observed once	
Book	27.5	2.7	9.7	5.6	27.5	2.9	10.4	11.5
Chalkboard	23.5	1.1	4.8	2.3	33.3	2.1	6.4	8.3
Workbook	37.3	3.9	10.4	8.2	17.6	.9	4.9	3.5
Manipulative	2.0	.7	3.7	1.5	9.8	.6	6.4	2.4
Paper/Pencil	80.4	15.3	19.0	32.0	60.8	9.6	15.9	38.1
Equipment	7.8	.4	4.5	.8	7.8	.4	4.5	1.6